Word Grader is a document checker for use by instructors in Microsoft Word or Microsoft Office application courses. Word Grader uses Microsoft Word’s Compare and Combine feature to merge a student document with the correct version of the assignment. Word Grader counts errors and embeds a grade report in the marked-up document. “PowerPoint Grader” is a companion product that grades Microsoft PowerPoint assignments. PowerPoint Grader extracts the text from a presentation and grades it. It also grades themes and slide layouts. Instructors have downloaded these graders hundreds of times and successfully integrated them into computer science curricula.

1 Introduction
Publishers of computer applications textbooks offer a variety of assessment tools. These tools include objective test banks, Microsoft Office simulators, and document checkers. Office simulators grade Microsoft Office tasks performed in a flash-based imitation Office environment. They assign students a task, and then record the students’ mouse and keyboard events used in their response. Those events are compared with possible correct actions and the results are graded. Office simulators include SAM (Cengage Learning) [1], myitlab (Pearson Education) [5], and SimNet (McGraw-Hill Higher Education) [4]. Some publishers also provide document checkers. These include SAM Projects, myitlab:Grader, SimGrader, and SNAP Document Checker (EMC Corporation) [2].

In 2004, this author introduced the desktop applications Excel Grader and Access Grader [3]. The programs perform document checking on Microsoft Excel and Microsoft Access homework assignments. Excel Grader performs static analysis on Microsoft Excel workbooks. The program compares a student workbook with the instructor’s correct version of the workbook. The student workbook is marked and a grade report is embedded. Formulas are graded using a computer algebra system. Excel Grader includes reports and a tool for plagiarism detection.

Access Grader is a Microsoft Access database application that grades Microsoft Access assignments. Access Grader grades database table and queries. Access Grader embeds an “ERRORS” table in the student database. Access Grader has similar reports and user interface as Excel Grader. According to a survey of instructors using the Excel Grader and Access Grader, the graders were extremely accurate and saved hours of grading time. Students that were surveyed felt the grading was fair and accurate.

2 Word Grader
Word Grader (see Figure 1) is a Microsoft Access application. The program requires instructors to gather all the student assignment files into the same folder. The instructor’s correct file is selected and the student directory is selected. Each student file in the directory is compared to the instructor’s correct version using Microsoft Word’s Compare and Combine feature.

Word’s Compare and Combine feature allows users to approve changes to documents, or to reconcile conflicting versions of documents. After comparing, Word Grader records each difference (revision) in an Access table.

Word Grader allows an instructor to set the grading scale. Instructors may also enter the number of points deducted per format error and point deducted for other error types. Typographical errors are deducted using the formula: (# Typo Characters) / (# Character in Document) * (Weight %). The instructor has control over the weighted percentage.

Figure 1: Word Grader Screen Shot.
The Revisions table (see Figure 2) includes the type of error encountered, the error description, the text in which the error occurred, and the location of the error.

To generate the grade report (see Table 1), the Revisions table is processed. Text errors generate two types of revisions: the correct text is inserted and the incorrect text is deleted. These revisions share a common start and end position. For example, if the correct text is "schoolhouse," and the student enters "schooljipse," two revisions are generated: first, a deletion of the text "jip." Next, a revision containing an insertion of the text "hou" is generated.

The deletion ends at character 9. The insertion begins at character 9. Although only three characters were mistyped, counting the lengths of both text strings results in an error count of six. Word Grader counts the length of the typographical error as \(\text{Max}(\text{Len}(\text{DeletionRevisionText}), \text{Len}(\text{InsertionRevisionText}))\).

### Table 1. Word Grader Embedded Student Grade Report

<table>
<thead>
<tr>
<th>File: WD_Wireless_Communications_(Online)_by_Doe.Jane.docx</th>
<th>Error Type</th>
<th>Error count</th>
<th>Weight</th>
<th>Points Deducted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Character Typos</td>
<td>58 (2.2%)</td>
<td>100&amp;</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Format</td>
<td>7</td>
<td>0.3 point(s)</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>20.3 point(s)</td>
<td>0.6</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>4.9</td>
<td></td>
</tr>
<tr>
<td>Final Grade: 95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Formatting errors are identified by their revision type or by the revision description. Some format revisions contain multiple errors, separated by commas.

Other Errors refer to any revision detected that is not an insertion/deletion or formatting error. These can include moved text, errors in tables, reference errors and others.

A sample graded student document follows (see Figure 3). The assignment is taken from Shelly and Cashman's Introductory Microsoft Office 2007 textbook [6].

3 Powerpoint Grader

PowerPoint Grader (see Figure 4) begins by extracting text both from the instructor and from student PowerPoint presentations. The text is compared using the same process in Word Grader. The presentation theme and slide layouts of presentations are also extracted.

The document produced by PowerPoint Grader is a Word document generated by the Word's Compare and Combine command.

![Figure 4: PowerPoint Grader Screen Shot.](image)

A background color is extracted from the instructor presentation and is applied to the graded student document. The student grade report with typographical and formatting error counts are generated in the same fashion as Word Grader.

A sample PowerPoint slide follows (Figure 5) with the corresponding marked-up output of PowerPoint Grader (Figure 6). The slide is taken from [6].
Future Work

Updates in the summer of 2010 were made to Word Grader. These updates increased the accuracy of the error counts.

Since the comparison is done by a Word function, grading new attributes (like text boxes) that are not compared by Microsoft’s function will be more difficult. The attribute comparison engine in Excel/Access Grader could be ported to Word Grader.

More PowerPoint document attributes need to be graded by PowerPoint Grader. Especially needed are embedded pictures and animation effects.

A survey to determine new feature requests desired by instructors using the programs would be useful.

All OfficeGrader.com graders are freely available from the website and shareware sites like softpedia.com.

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References


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